IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Tal Drory et al.	§	Group Art Unit: 2161
Serial No.: 10/814,579	§	Examiner: Daye, Chelcie L.
Filed: March 31, 2004	§	
For: METHOD AND APPARATUS FOR QUERYING SPATIAL DATA	§	Atty. Docket: 200315226-1 NUHP:0240/BLT/POW

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October 9, 2007	**/W. Allen Powell/**
Date	W. Allen Powell

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on August 10, 2007, and received by the Patent Office on August 15, 2007.

1. REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, the Assignee of the above-referenced application by virtue of the Assignment to Hewlett-Packard Development Company recorded at reel 015173, frame 0532, and dated March 31, 2004. Accordingly, Hewlett-Packard Development Company will be directly affected by the Board's decision in the pending appeal.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. STATUS OF CLAIMS

Claims 1-23 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal.

4. STATUS OF AMENDMENTS

There are no outstanding amendments to be considered by the Board.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The Application contains 6 independent claims, namely, claims 1, 6, 11, 12, 17, and 21, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 1 relates to a system for performing query operations. The system comprises a base table (e.g., base table 84) having a plurality of spatial objects (e.g., spatial objects R-U). *See*, *e.g.*, Application, paragraphs 9, 16-30, and 38. The system also comprises an index table (e.g., index table 90) that comprises a plurality of data entries, the plurality of data entries being associated with the plurality of spatial objects. *See*, *e.g.*, Application, paragraphs 16, 18-20, 22, 23, and 25-46. Further, the system comprises a module adapted to perform a query operation on the index table, the module configured to convert a query window (e.g., query window 144) into a plurality of values, create a scan range for each of the plurality of values with a begin range value and an end range value from the plurality of values, wherein the scan range includes a stop condition, scan the plurality of data entries for each of the scan ranges to identify one of the end range value and the stop condition, and return a result based upon the

plurality of data entries that are within the scan range for each of the plurality of values. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

With regard to the aspect of the invention set forth in independent claim 6, discussions of the recited features of claim 6 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 6 relates to a system for performing query operations. The system comprises a base table (e.g., base table 84) having a plurality of spatial objects (e.g., spatial objects R-U). *See*, *e.g.*, Application, paragraphs 9, 16-30, and 38. The system also comprises an index table (e.g., index table 90) that comprises a plurality of data entries, the plurality of data entries being associated with the plurality of spatial objects in the base table. *See*, *e.g.*, Application, paragraphs 16, 18-20, 22, 23, and 25-46. Further, the system comprises a module adapted to perform a query operation on the index table, the module configured to convert a query window (e.g., query window 144) into a plurality of values, perform a first scan for one of the plurality of values on the plurality of data entries, return a result from the first scan of the plurality of data entries, determine whether a second of the plurality of values may return the result with a second scan, skip the second scan if the second scan is determined to return the result, and perform the second scan if the second scan is determined not to return the result. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

With regard to the aspect of the invention set forth in independent claim 11, discussions of the recited features of claim 11 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 11 relates to a system for performing a query operation. The system comprises means for transforming a query window (e.g., query window 144) into a plurality of values. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46. Further, the system comprises means for creating a scan range with a begin range value, an end range value, and a stop condition for each of the plurality of values, means for scanning a plurality of data entries until one of the end range value and the stop condition, and means for returning a result based upon the plurality of data entries that

are within the scan range of each of the plurality of values. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

With regard to the aspect of the invention set forth in independent claim 12, discussions of the recited features of claim 12 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 12 relates to a method of performing a query operation. The method comprises converting a query window (e.g., query window 144) into a plurality of values, defining a begin range, an end range, and a stop condition for each of the plurality of values, scanning a plurality of data entries until one of the end range and the stop condition, and returning a result based upon the plurality of data entries that are between the begin value and one of the end range and the stop condition for each of the plurality of values. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

With regard to the aspect of the invention set forth in independent claim 17, discussions of the recited features of claim 17 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 17 relates to a method of performing a query operation. The method comprises converting a query window (e.g., query window 144) into a plurality of values, performing a first scan for one of the plurality of values on a plurality of data entries of an index table, returning a result from the first scan of the plurality of data entries in the index table, determining whether a second of the plurality of values may return the result with a second scan, skipping the second scan if the second of the plurality of values is determined to return the result, and performing the second scan if the second plurality of values is determined not to return the result. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

With regard to the aspect of the invention set forth in independent claim 21, discussions of the recited features of claim 21 can be found at least in the below cited locations of the specification and drawings. By way of example, claim 21 relates to a computer-readable medium that stores machine-readable instructions. The instructions comprise code for generating an index table (e.g., index table 90) stored

on the machine readable medium, the index table containing a plurality of data entries. *See*, *e.g.*, Application, paragraphs 16, 18-20, 22, 23, and 25-46. The instructions also comprise code for generating a query module stored on the machine readable medium, the query module configured to convert a query window (e.g., query window 144) into a plurality of values, create a scan range for each of the plurality of values with a begin range value, an end range value, and a stop condition. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46. The query module is also configured to scan the plurality of data entries until one of the end range value and the stop condition, and return a result based upon the plurality of data entries that are within the scan range for each of the plurality of values. *See*, *e.g.*, Application, paragraphs 20, 28-30, 33-38, 40, 42, 45, and 46.

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Appellants respectfully urge the Board to review and reverse the Examiner's sole ground of rejection in which the Examiner rejected claims 1-23 under 35 U.S.C. § 103(a) as being unpatentable over Wang et al. (US Patent No. 6,920,446) (hereinafter referred to as "Wang"), in view of Shaw et al. (US Patent No. 6,684,219) (hereinafter referred to as "Shaw").

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under 35 U.S.C. § 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants strongly believe that claims 1-23 are currently in condition for allowance.

A. Ground of Rejection:

The Examiner rejected claims 1-23 under 35 U.S.C. § 103(a) as being unpatentable over Wang in view of Shaw. The Examiner rejected each of independent claims 1, 6, 11, 12, 17, and 21 on the basis of Wang and Shaw. However, the Examiner rejected claims 1, 11, 12, and 21 as a group and claims 6 and

17 as a separate group. Appellants respectfully traverse these rejections and will address them in detail below based on the Examiner's grouping.

1. Judicial precedent has clearly established a legal standard for obviousness rejections.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). To establish *prima facie* obviousness of a claimed invention, *all* the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 U.S.P.Q. 580 (C.C.P.A. 1974) (emphasis added). In addressing obviousness determinations under 35 U.S.C. § 103, the Supreme Court in *KSR International Co. v. Teleflex Inc.*, No. 04-1350 (April 30, 2007), reaffirmed many of its precedents relating to obviousness including its holding in *Graham v. John Deere Co.,* 383 U.S. 1 (1966). In *KSR*, the Court also reaffirmed that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.* at 14. In this regard, the *KSR* court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does … because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.* at 14-15. In *KSR*, the court noted that the demonstration of a teaching, suggestion, or motivation to combine provides a "helpful insight" in determining whether claimed subject matter is obvious. *KSR, slip op.* at 14.

Furthermore, the *KSR* court did not diminish the requirement for objective evidence of obviousness. *Id.* at 14 ("To facilitate review, this analysis should be made explict. See *In re Kahn,* 441 F.3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the

analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ."); s*ee also, In re Lee,* 61 U.S.P.Q.2d 1430, 1436 (Fed. Cir. 2002) (holding that the factual inquiry whether to combine references must be thorough and searching, and that it must be based on *objective evidence of record*).

2. The cited references are deficient with respect to the recited features of claims 1, 11, 12 and 21.

The rejection of independent claims 1, 11, 12 and 21 is improper because Wang, Shaw and/or their hypothetical combination clearly do not disclose or suggest all elements of the claimed subject matter. For example independent claim 1 recites a system for performing query operations having a module configured to "convert a query window into a plurality of values," and "create a scan range for each of the plurality of values with a begin range value and an end range value from the plurality of values, wherein the scan range includes a stop condition." (Emphasis added.) The module recited in dependent claim 1 is further adapted to "scan the plurality of data entries for each of the scan ranges to identify one of the end range value and the stop condition." (Emphasis added.) Similarly, independent claim 11 recites a system having "means for creating a scan range with a begin range value, an end range value, and a stop condition for each of the plurality of values," and "means for scanning a plurality of data entries until one of the end range value and the stop condition." (Emphasis added.) Independent claims 12 and 21 are directed towards a method and a computer-readable medium, respectively, reciting subject matter similar to that quoted above in independent claims 1 and 11.

In contrast, Wang, Shaw and/or their hypothetical combination do not disclose a module configure to perform the above recited query operations. In rejecting the above-claimed subject matter the Examiner relied on a portion of the Shaw reference relating to a query process whereby a

> system responds at step 92 by accessing the object-oriented databases, searching for a match between the

> database of spatial objects and the requested area of interest. This process is shortened by accessing the VPF metadata for the VPF library objects within the database. At step 93, the system lists to the user all databases whose geographic coverage includes at least part of the area of interest, regardless of whether the databases are VPF, RPF, or TPS. The user selects the database of choice at step 94. The system responds at steps 95 and 96 by listing all libraries within the database whose objects at least intersect the geographic area of interest. At step 97, the user selects a library of choice, in response to which the system lists to the user at step 98 all coverages and features covered by the selected library. Exemplary coverages include population, obstruction, hydrography, earth cover, transportation, and navigation. The user then selects at step 99 a coverage or feature(s) desired. To access the entire library, for example, the user would select all listed features. At step 101 the system accesses the spatial data manager to search for all library objects within the geographical area of interest with the desired coverage or feature(s). For VPF databases, a spatial data manager exists for each coverage and each feature type. For RPF databases, a spatial data manager exists for each coverage only.
>
> Shaw, col. 14, lines 24-65.

The Examiner interpreted lines 24-56 of the above-quoted portion of Shaw as corresponding to the claimed module configured to convert a query window into a plurality of values. Final Office Action, page 3. However, in contrast to the presently claimed feature, the portion of Shaw cited by the Examiner relates to a user interactively selecting databases and libraries used for performing searches within a geographical area of interest. Indeed, the cited portion of Shaw merely appears to disclose listing databases related to an area of interest, not converting a query window. Further, while column 14 of Shaw discusses the need to find the objects in the area of interest, it does not indicate how these objects are to be found. Accordingly, the cited portion of Shaw clearly fails to disclose or suggest a module configured to convert a query window into a plurality of values, as recited by independent claim 1, and as similarly recited by independent claims 11, 12 and 21.

Further, in rejecting the claimed feature relating to creating a scan range for each of the plurality of values, the Examiner cited column 7, lines 50-64, which includes a table identified as "Table 4" that includes four columns labeled "Block Start," "Block End," "ZCode," and "Level," respectively. *See* Final Office Action, pages 3 and 9. Also, with respect to the feature relating to creating a scan range for each of the plurality of values, the Examiner relied on a portion of the Wang reference in which:

> a given spatial object (e.g., a map representing a region of the world), the spatial object is decomposed into z-regions. Thus, as shown in FIG. 2, the space at z-level 0 is divided into two halves along an axis (referred to as a hyperplane). Top-down z-ordering decomposition works as follows: Starting with the complete data space, z-regions are computed by splitting the respective data space along hyperplanes (e.g., one of a vertical axis and horizontal axis). The z-regions are iteratively split until a termination criterion is met. After every split, a z-region in which a spatial object is found is further analyzed.
>
> Wang, col. 4, lines 22-30.

The cited references do not disclose a module configured to create a scan range for each of a plurality of values converted from the query window with a "begin range" value and an "end range" value, wherein the scan range includes a stop condition. In contrast to the Examiner's interpretation, the Wang reference merely discloses a Z-value ordering scheme and resulting granularization of the Z-values. Specifically, Table 4 of Wang is merely an example for merging neighboring Z-values that shows a range of blocks and their corresponding Z-codes. This does not include a scan range and certainly not a scan range for <u>each</u> of a plurality of values converted from a query window. Table 4 of Wang includes the words "block start" and "block end," but this is only showing the start and end of the neighboring Z-values to be merged to a larger Z-value in a higher level. There is no disclosure or suggestion in Wang, Shaw or their hypothetical combination of a module configured to create a scan range for each of the plurality of values, much less one that creates a begin range value and an end range value from the plurality of values, wherein the scan range includes a stop condition, as recited by independent claims 1, 11, 12 and 21.

Accordingly, the hypothetical combination of Wang and Shaw cannot render the Appellants' claims obvious. Therefore, the Appellants' respectfully assert that the rejection of independent claims 1, 11, 12 and 21 under 35 U.S.C. § 103 is erroneous and should be withdrawn. Accordingly, Appellants request that the Board overturn the Examiner's rejection of independent claims 1, 11, 12 and 21, as well as those claims depending thereon.

3. The cited references are deficient with respect to the recited features of claims 6 and 17.

In rejecting independent claims 6 and 17 the Examiner stated:

> Regarding Claims 6, 17, and 20, the combination of Wang in view of Shaw, disclose a system for performing query operations, the system comprising:
>
> a base table having a plurality of spatial objects (column 4, lines 37-43, Wang); an index table that comprises a plurality of data entries, the plurality of data entries being associated with the plurality of spatial objects in the base table (column 10, lines 16-43, Shaw); a module adapted to perform a query operation on the index table (column 14, lies 8-24, Shaw), the module configured to; convert a query window into a plurality of values (column 14, lines 24-56, Shaw); perform a first scan for one of the plurality of values on the plurality of data entries (column 5, lines 27-41, Wang); return a result from the first scan of the plurality of data entries, (column 5, lines 54-57 and Table 1, Wang); determine whether a second of the plurality of values may return the result with a second scan (column 6, lines 30-36, Wang); skip the second scan if the second scan is determined to return the result (column 7, lines 58-64, Wang); and perform the second scan if the second scan is determined not to return the result (column 6, lines 15-24, Wang).
>
> Final Office Action, pages 4-5.

The rejection of independent claims 6 and 17 under 35 U.S.C. § 103 is improper because Wang, Shaw and/or their hypothetical combination clearly do not disclose or suggest each element of the claimed subject matter. First, independent

claims 6 and 17 are allowable because they recite subject matter that is in part similar to the subject of independent claims 1, 11, 12 and 21, shown to be missing from the cited references. Second, claims 6 and 17 are allowable because they recite additional subject matter that is not disclosed or suggested by Wang and/or Shaw. For example, independent claim 6 recites a system having a module adapted to "perform a first scan for one of the plurality of values on the plurality of data entries; return a result from the first scan of the plurality of data entries; determine whether a second of the plurality of values may return the result with a second scan; skip the second scan if the second scan is determined to return the result; and perform the second scan if the second scan is determined not to return the result." Independent claim 17 recites similar subject matter.

In rejecting the claims, the Examiner attempted to combine various portions of Wang and Shaw to address the claimed subject matter. For example, in rejecting the claimed feature relating to skipping the second scan if the second scan is determined to return the result, the Examiner relied on a portion of the Wang reference describing

> In Table 4, the merged level-6 z-regions are in a block at z-level 4 that starts at [2,2] and ends at [3,3]. The z-code associated with this block is 0011. The remaining z-regions are still at level 6 since they have not been merged at 116. The merge at 116 is repeated until there are no further neighboring z-regions (at any z-level) with z codes that differ only by the least significant bit.
>
> Wang, col. 7, lines 58-64.

The above disclosure of Wang pertains to merging of Z-regions and clearly lacks any teaching or suggestion relating to the claimed subject matter of skipping a second scan. As such, Wang alone or in a hypothetical combination with Shaw does not disclose or suggest skipping the second scan if the second scan is determined to return the result.

Further, Shaw does not cure the deficiencies of Wang because it, too, does not disclose a module configured to perform a first scan for one of the plurality of values on the plurality of data entries; return a result from the first scan of the plurality of

data entries; determine whether a second of the plurality of values may return the result with a second scan; skip the second scan if the second scan is determined to return the result; and perform the second scan if the second scan is determined not to return the result, as recited by independent claim 6, and as similarly recited by independent claim 17. Indeed, Shaw is not even alleged to disclose this subject matter by the Examiner.

Because Wang or Shaw, either alone or together in hypothetical combination, do not contain each element of independent claims 6 or 17, the alleged combination of Wang and Shaw cannot render those claims obvious. The Appellants therefore respectfully assert that the rejections of independent claims 6 and 17 under Section 103 are erroneous and should be withdrawn. Accordingly, Appellants request that the Board overturn the Examiner's rejection of independent claims 6 and 17, as well as those claims depending thereon.

Conclusion

Appellants respectfully submit that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: October 9, 2007

/W. Allen Powell/

W. Allen Powell
Reg. No. 56,743
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545

8. APPENDIX OF CLAIMS ON APPEAL

Listing of Claims:

1. A system for performing query operations, the system comprising:

a base table having a plurality of spatial objects;

an index table that comprises a plurality of data entries, the plurality of data entries being associated with the plurality of spatial objects;

a module adapted to perform a query operation on the index table, the module configured to;

convert a query window into a plurality of values;

create a scan range for each of the plurality of values with a begin range value and an end range value from the plurality of values, wherein the scan range includes a stop condition;

scan the plurality of data entries for each of the scan ranges to identify one of the end range value and the stop condition; and

return a result based upon the plurality of data entries that are within the scan range for each of the plurality of values.

2. The system set forth in claim 1, wherein the stop condition is satisfied if one of the plurality of data entries is not Z-value equivalent to one of the plurality of values being utilized to scan the plurality of data entries.

3. The system set forth in claim 1, wherein the index table is a Polygon Map Region QuadTree index.

4. The system set forth in claim 1, wherein the plurality of data entries each comprises a Z-value field and an object identification field.

5. The system set forth in claim 4, wherein the result comprises a plurality of object identification fields that correspond to a plurality of data entries.

6. A system for performing query operations, the system comprising:

a base table having a plurality of spatial objects;

an index table that comprises a plurality of data entries, the plurality of data entries being associated with the plurality of spatial objects in the base table;

a module adapted to perform a query operation on the index table, the module configured to;

convert a query window into a plurality of values;

perform a first scan for one of the plurality of values on the plurality of data entries;

return a result from the first scan of the plurality of data entries;

determine whether a second of the plurality of values may return the result with a second scan;

skip the second scan if the second scan is determined to return the result; and

perform the second scan if the second scan is determined not to return the result.

7. The system set forth in claim 6, wherein the plurality of values comprises a plurality of Z-values and the plurality of data entries comprise a plurality of fields, wherein one of the plurality of fields is a Z-value field.

8. The system set forth in claim 6, wherein the results comprise an empty identifier or a table having a plurality of Z-values and a plurality of object identifications.

9. The system set forth in claim 6, comprising creating a scan range for each of the plurality of values with a begin range value and an end range value from the plurality of values, wherein the scan range includes a stop condition.

10. The system set forth in claim 9, wherein the begin range value is higher than the end range value; and the module is configured to perform the first scan on the plurality of data entries in descending order.

11. A system for performing a query operation, comprising:

means for transforming a query window into a plurality of values;

means for creating a scan range with a begin range value, an end range value, and a stop condition for each of the plurality of values;

means for scanning a plurality of data entries until one of the end range value and the stop condition; and

means for returning a result based upon the plurality of data entries that are within the scan range of each of the plurality of values.

12. A method of performing a query operation, the method comprising:

converting a query window into a plurality of values;

defining a begin range, an end range, and a stop condition for each of the plurality of values;

scanning a plurality of data entries until one of the end range and the stop condition; and

returning a result based upon the plurality of data entries that are between the begin value and one of the end range and the stop condition for each of the plurality of values.

13. The method set forth in claim 12, comprising deriving an index table of the plurality of data entries from a base table of a plurality of spatial objects.

14. The method set forth in claim 12, wherein the plurality of data entries is a Polygon Map Region QuadTree index.

15. The method set forth in claim 12, wherein scanning comprises comparing each of the plurality of data entries to at least one of the plurality of values to determine if each of the plurality of data entries is Z-value equivalent to the at least one of the plurality of values.

16. The method set forth in claim 12, wherein steps of the method are performed in an order in which they are recited.

17. A method for performing query operations, the method comprising:

converting a query window into a plurality of values;

performing a first scan for one of the plurality of values on a plurality of data entries of an index table;

returning a result from the first scan of the plurality of data entries in the index table;

determining whether a second of the plurality of values may return the result with a second scan;

skipping the second scan if the second of the plurality of values is determined to return the result; and

performing the second scan if the second plurality of values is determined not to return the result.

18. The method set forth in claim 17, wherein the result may be one of an empty identifier or a table that comprises a Z-value field and an object identification field.

19. The method set forth in claim 17, comprising combining each of the results into a result table to be provided to a user in response to the query operation.

20. The method set forth in claim 17, wherein steps of the method are performed in an order in which they are recited.

21. A computer-readable medium that stores machine-readable instructions, comprising:

code for generating an index table stored on the machine readable medium, the index table containing a plurality of data entries; and

code for generating a query module stored on the machine readable medium, the query module configured to:

convert a query window into a plurality of values;

create a scan range for each of the plurality of values with a begin range value, an end range value, and a stop condition;

scan the plurality of data entries until one of the end range value and the stop condition; and

return a result based upon the plurality of data entries that are within the scan range for each of the plurality of values.

22. The computer program set forth in claim 21, wherein the query module is further configured to return a plurality of results based upon the plurality of data entries that are within the scan range for each of the plurality of values.

23. The computer program set forth in claim 21, wherein the plurality of data entries each comprises a Z-value field and an object identification field.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.